AF/3682

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Docket No.: ULLEIN

In re Application of:	
THOMAS ULLEIN & BOLKO SCHUSEIL	**Examiner: Johnson, Vicky A.**
Appl. No.: 09/925,013	**Group Art Unit: 3682**
Filed: August 8, 2001	
For: CHAIN TENSIONER	

BRIEF OF APPEAL

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450", on April 2, 2004.
(Date)

HENRY M. FEIEREISEN
Name of Registered Representative

Signature

4-2-2004
Date of Signature

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S I R:

This is an appeal from the final rejection of claims 1-4, 6-15, 17-22, 27-30, 32 and 33 by the Primary Examiner. The Brief is being filed under the provisions of 37 C.F.R. 1.192. A check in the amount of $330.00 to cover the requisite fee set forth in §1.17(c) is attached.

To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. The Commissioner is hereby authorized to charge fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment to Deposit Account No. 06-0502.

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(1) REAL PARTY IN INTEREST

The above-referenced patent application has been assigned to INA Wälzlager Schaeffler OHG, the real party in interest.

(2) RELATED APPEALS AND INTERFERENCES

There are no and there have been no related appeals or interferences.

(3) STATUS OF CLAIMS

The following claims are on appeal:

Claims 1-4, 6-15, 17 and 18 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 5,931,754 to Stief.

Claims 19-22, 27-30, 32 and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Stief in view of U.S. Pat. No. 6,361,458 to Smith.

(4) STATUS OF AMENDMENTS

Appellant has filed a request for reconsideration under 37 C.F.R §1.116 after issuance of the final rejection. In accordance with an Advisory Action by the Examiner in charge of this application, the Request for Reconsideration has been entered but was not deemed to place the application in condition for allowance.

(5) SUMMARY OF INVENTION

The present invention is directed to the construction of a chain tensioner of a type having a tensioner piston which is spring-biased against a chain and oscillates within a cylinder to maintain the chain taut. More particularly, the present invention is directed to the configuration of the leakage gap size in order to effectively control damping performance of the chain tensioner by adjusting the amount of hydraulic fluid exiting the pressure chamber, as the tensioner piston moves into the pressure chamber (paragraph [0008]).

In accordance with the subject matter of claim 1, the chain tensioner includes a control member by which the size of the leakage gap is reduced as the pressure in the pressure chamber increases so that less hydraulic fluid is able to migrate out of the pressure chamber. As a result, the characteristic damping curve of the chain tensioner is made harder to prevent the piston from moving excessively into the pressure chamber (paragraph [0033], last four lines).

Independent claim 28 sets forth a more detailed structure of the control member for regulating a flow of fluid through the leakage gap to the outside by reciting the interrelationship with two stops. In other words, while the control member rests against one stop, outflow from the pressure chamber is possible via grooves (21). When the pressure in the pressure chamber increases beyond an upper limit, the control member is moved against the other stop, thereby reducing an outflow of fluid (paragraph [0033]).

Independent claim 32 sets forth a more detailed configuration of the leakage gap, namely in the form of two separate leakage portions (12, 22), whereby the control member is provided to regulate the outflow from the pressure chamber via one of the leakage gap portions (leakage gap portion 22). In other words, the control member is able to cut off a flow of hydraulic fluid through the leakage gap portion (22) so that the fluid flow through the leakage gap is reduced.

(6) ISSUES

Issue 1-Whether claims 1-4, 6-15, 17 and 18 are patentable under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 5,931,754 to Stief?

Issue 2-Whether claims 19-22, 27-30, 32 and 33 are patentable under 35 U.S.C. §103(a) as being unpatentable over Stief in view of U.S. Pat. No. 6,361,458 to Smith?

(7) GROUPING OF CLAIMS

For each ground of rejection which appellant contests herein which applies to more than one claim, such additional claims, to the extent separately identified and argued below, do not stand or fall together.

(8) ARGUMENT

Issue 1-Whether claims 1-4, 6-15, 17 and 18 are patentable under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 5,931,754 to Stief?

Independent claim 1 sets forth a control member which is exclusively responsive to the pressure in the pressure chamber to thereby regulate a flow of hydraulic fluid through the leakage gap out of the pressure chamber for controlling damping performance of the chain tensioner. As a consequence, the damping performance can be adjusted in response to the inward movement of the piston. In other words, by reducing the outflow of fluid through the leakage gap from the pressure chamber, the inward movement of the piston can be damped harder and thus can be opposed to a greater degree.

The Stief reference describes a chain tensioner in which hydraulic oil in a high pressure chamber flows out of the high pressure chamber through a leakage gap formed between the tensioner piston and the tensioner cylinder during retraction of the piston. Reference is made to col. 4, lines 10 to 23, col. 5, lines 64 to 67, and col. 6, lines 65-67. These passages are the only ones in the Stief description that make reference to the leakage gap. Nothing relates in any way in any of these passages nor in any other passage of the disclosure to the possibility of controlling the outflow of hydraulic fluid from the pressure chamber to the outside. In other words, Stief is completely silent as to the possibility of a control of damping performance through modifying the leakage gap size.

The Examiner opined in the Final Office Action that Stief describes the provision of "*a control member (7) for at least reducing the leakage gap in size when a pressure in the pressure chamber increases (col. 4, lines 7-10, during extension of the piston 2 decreases and the ball open from its seat so that fluid flows through the gap between chambers 8 and 9 and the gap 14, during retraction of the piston 2 the pressure in chamber 8 increases to dampen the effects of the chain, and the ball of the valve closes the gap between the chambers 8 and 9 allowing fluid to only flow through the gap 14).*". Appellant respectfully disagrees with the Examiner's reading of Stief. As described in col. 4, lines 7 to 10, reference numeral (7) in Stief relates to a non-return valve that opens, when the piston moves out to allow inflow of hydraulic fluid into the pressure chamber (8) from the fluid reservoir (9).

The purpose of the non-return valve in Stief, like the purpose of the check valve (6) of the chain tensioner according to the present invention, is merely to allow flow of fluid through a passageway into the pressure chamber in response to an underpressure in this chamber in relation to the pressure in the fluid reservoir, when the piston moves out. Nothing flows out through this passageway, neither during extension of the piston nor during retraction of the piston. Outflow of hydraulic fluid in Stief is only realized via the leakage gap (14 or 34). In addition, the assessment by the Examiner that fluid is able to flow out through the gap (14) during extension of the piston is pure speculation by the Examiner and not substantiated in any way by the disclosure in Stief. Fluid flows through the gap (14) only during retraction of the piston, and fluid is able to flow out of the pressure

chamber exclusively through this gap (14). Reference is made again to col. 4, lines 10 to 23, col. 5, lines 64 to 67, and col. 6, lines 65-67 in Stief.

In the Advisory Action in response to appellant's request for reconsideration, filed under 37 C.F.R 1.116, the Examiner noted that "*the term leakage relates to an act by which fluid enters or escapes through an opening usually by mistake. The passage between the chambers 8 and 9 meets that definition. The fluid enters through the opening in the chamber 8, although it is not by mistake.*". Appellant believes that the Examiner's reasoning is ill-advised for several reasons.

First, the term "leakage gap" in the context of the present invention generally relates to a seepage of fluid out of the pressure chamber, as the piston retracts (compare, e.g., also paragraph [0032] lines 3 to 5, or paragraph [0038] lines 1 to 3 of the instant specification). The provision of the leakage gap is a necessary feature of the chain tensioner and not there by mistake.

Second, the Examiner's statement is divorced from the language of independent claim 1 which clearly sets forth the control of hydraulic fluid out of the pressure chamber, as the pressure in the pressure chamber increases. Entry of hydraulic fluid into the pressure chamber through the leakage gap or through any other opening or passageway is not an issue here and not recited in claim 1 in any way.

It is appellant's contention that the Examiner misinterpreted the Stief reference, failed to properly appreciate appellant's recognition of a problem

relating to damping performance, and failed to appreciate appellant's discovery of a solution to this problem.

It is therefore respectfully submitted that the rejection of claim 1 under 35 U.S.C. 102(b) should be reversed.

Claims 2-4, 6-15, 17 and 18, respectively dependent from claim 1, are considered allowable by virtue of their dependencies. These claims are further considered allowable on their own merits as they recite other features of the invention neither taught nor suggested by Stief.

Claims 2 and 10 recite the implementation of the control member in the form of a valve to control the size of the leakage gap. Stief fails to teach or suggest this feature of the claimed invention. Claims 2-4, 6-9 and 19 recite further limitations relating to the construction and operation of the valve.

Claim 11 recites the subdivision of the leakage gap into two portions for outflow of hydraulic fluid, with the control member reducing one of the portions in size to control the outflow of hydraulic fluid. Stief fails to teach or suggest this feature of the claimed invention. Claims 12-15, 17-18 recite further limitations relating to the construction and operation of the control member.

It is therefore respectfully submitted that the rejection of claims 1-4, 6-15, 17 and 18 under 35 U.S.C. 102(b) should be reversed.

Issu 2-Whether claims 19-22, 27-30, 32 and 33 ar patentabl und r 35 U.S.C. §103(a) as being unpat ntable ov r Sti f in vi w of U.S. Pat. No. 6,361,458 to Smith?

Each of the independent claims 28 and 32 sets forth a control member which is exclusively responsive to the pressure in the pressure chamber to thereby regulate a flow of hydraulic fluid through the leakage gap out of the pressure chamber for controlling damping performance of the chain tensioner.

The Stief reference has been discussed above in detail, and the same arguments apply here with respect to independent claims 28 and 32 so that a repetition thereof is omitted for sake of convenience.

The Smith reference is directed to a hydraulic tensioner having a piston (130) slideably received in a cylinder (102), and a pressure relief valve (300) positioned in the nose (134) of the piston (130). The valve moves away from its seat, when the pressure in the pressure chamber (180) exceeds a predetermined maximum level, so as to release fluid (col. 4, lines 11-15). The Smith reference thus describes a construction that entails an action that the present invention, in fact, tries to prevent. While in the present invention, the construction of the chain tensioner reduces an outflow of hydraulic fluid from the pressure chamber, as the size of the leakage gap is reduced so as to make the damping action of the chain tensioner harder, the Smith reference promotes an escape of flow of fluid from the pressure chamber so that the damping action becomes indeed softer.

Appellant therefore respectfully disagrees with the Examiner's assertion that a combination of Stief and Smith produces the present invention, as recited in claim 28. The Examiner's rejection of claim 28 is also confusing for the following reason: On page 7, first paragraph, of the Final Rejection, the Examiner refers to "passageways (326)" in connection with "Fig. 7". However, reference numeral "326" is not shown in Fig. 7. Accordingly, this portion of the Office Action is not understood and clarification is requested to enable appellant to properly respond to this ground for rejection.

Claims 19-24, respectively dependent from claim 1, are considered allowable by virtue of their dependencies. These claims are further considered allowable on their own merits as they recite other features of the invention neither taught nor suggested by Stief nor Smith nor a combination thereof.

Claims 27, 29-30, respectively dependent from claim 28, are considered allowable by virtue of their dependencies. These claims are further considered allowable on their own merits as they recite other features of the invention neither taught nor suggested by Stief nor Smith nor a combination thereof.

Claim 33, dependent from claim 32, is considered allowable by virtue of its dependency. This claim is further considered allowable on their own merits as they recite other features of the invention neither taught nor suggested by Stief nor Smith nor a combination thereof.

It is therefore respectfully submitted that the rejection of claims 19-22, 27-30, 32 and 33 under 35 U.S.C. 103(a) should be reversed.

(9) CONCLUSION

Appellant has invented a chain tensioner with a mechanism to reduce a flow of hydraulic fluid out of the pressure chamber in response to a certain upper pressure level in the pressure chamber.

The cited prior art does neither teach nor suggest the essential features as defined in independent claims 1, 28 and 32 of the present invention but merely show an arrangement by which the outflow of fluid remains constant (Stief reference), or an arrangement by which the outflow of hydraulic flow is increased at a certain specified maximum level (Smith).

Therefore, the rejection of independent claims 1, 28 and 32 on this prior art is not well taken.

For the above stated reasons, it is respectfully submitted that the rejection of the claims 1-4, 6-15, 17-22, 27-30, 32 and 33 issued by the Examiner on the references should be reversed.

Respectfully submitted,

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(10) APPENDIX

1. A chain tensioner, comprising:

   a tensioner piston bearing upon a chain;

   a cylinder guiding the piston for movement in a direction of the chain and bounding with the piston a pressure chamber for receiving hydraulic fluid;

   a leakage gap for migration of hydraulic fluid from the pressure chamber; and

   a control member for at least reducing the leakage gap in size, when a pressure in the pressure chamber increases.

2. The tensioner of claim 1, wherein the control member is a valve having a valve body for bounding the leakage gap, said valve body being configured for displacement to at least reduce the leakage gap in size, when the pressure in the pressure chamber increases.

3. The tensioner of claim 2, wherein the valve body clears the leakage gap, when the pressure in the pressure chamber drops below a critical lower level, and at least reduces the leakage gap in size, when the pressure in the pressure chamber exceeds a critical upper level.

4. The tensioner of claim 2, and further comprising a first stop, wherein the valve body clears the leakage gap, when abutting against the first stop.

5. The tensioner of claim 4, wherein the first stop is formed by a valve seat, which defines the leakage gap in concert with the valve body.

6. The tensioner of claim 4, and further comprising a valve spring for biasing the valve body against the first stop.

7. The tensioner of claim 2, and further comprising a second stop, wherein the valve body is configured to abut the second stop, when the pressure in the pressure chamber increases to thereby at least reduce the leakage gap in size.

8. The tensioner of claim 7, wherein the second stop forms a valve seat for the valve body.

9. The tensioner of claim 6, wherein the valve body is moved away from the first stop in opposition to a spring action applied by the valve spring, as the pressure in the pressure chamber increases.

10. The tensioner of claim 1, wherein the control member is a valve in communication with the pressure chamber.

11. The tensioner of claim 1, wherein the leakage gap is subdivided in a first leakage gap portion and a second leakage gap portion, wherein the control member clears the first leakage gap portion, when the pressure in the pressure chamber drops below a critical lower level, and at least reduces the second leakage gap portion in size, when the pressure in the pressure chamber exceeds a critical upper level.

12. The tensioner of claim 11, wherein the control member is a valve having a valve body which closes the second leakage gap portion, when the pressure in the pressure chamber exceeds the critical upper level.

13. The tensioner of claim 12, and further comprising a first stop, wherein the valve body abuts against the first stop to clear the second leakage gap portion, when the pressure in the pressure chamber drops below the critical lower level.

14. The tensioner of claim 12, and further comprising a second stop, wherein the valve body abuts against the second stop to at least reduce the second leakage gap portion in size, when the pressure in the pressure chamber exceeds the critical upper level.

15. The tensioner of claim 13, and further comprising a valve spring for biasing the valve body against the first stop.

16. The tensioner of claim 13, wherein the first stop is formed as valve seat for the valve body.

17. The tensioner of claim 14, wherein the second stop is formed as valve seat for the valve body.

18. The tensioner of claim 13, and further comprising a second stop, wherein the valve body abuts against the second stop to at least reduce the second leakage gap in size, when the pressure in the pressure chamber exceeds the critical upper level, wherein the valve body is disposed between the first and second stops.

19. The tensioner of claim 2, wherein the valve body is configured as plunger, which is guided in the cylinder for longitudinal displacement.

20. The tensioner of claim 19, wherein the plunger defines the leakage gap in concert with the cylinder.

21. The tensioner of claim 19, and further comprising a valve spring for biasing the plunger in a direction toward a first stop, said piston clearing the leakage gap, when abutting against the first stop.

22. The tensioner of claim 21, wherein the plunger is moved away from the first stop to abut against a second stop, when the pressure in the pressure chamber exceeds the upper critical level, to thereby close the leakage gap.

23. The tensioner of claim 22, wherein the second stop has a seat area for the plunger, whereby the piston is configured to tightly bear against the seat area.

24. The tensioner of claim 19, and further comprising a check valve integrated in the plunger, so that the plunger and the check valve form a structural unit.

27. The chain tensioner of claim 28, wherein the first seat is formed with circumferential grooves to define the passageways.

28. A chain tensioner, comprising:

a tensioner piston bearing upon a chain;

a cylinder guiding the piston for movement in a direction of the chain and bounding with the piston a pressure chamber for receiving hydraulic fluid; and

a control member for regulating a fluid flow through a leakage gap to the outside in dependence on a pressure in the pressure chamber to thereby adjust a damping behavior during operation, wherein the control member is movable between first and second stops and spring-biased to seek a position against a first stop, wherein the first stop has passageways to allow seepage of hydraulic fluid through the leakage gap, wherein the control member moves

toward the second stop to at least reduce the fluid flow through the leakage gap, as the pressure in the pressure chamber rises.

29. The chain tensioner of claim 28, wherein the control member is a ball valve disposed between the first and second stops.

30. The chain tensioner of claim 28, wherein the control member is a plunger disposed between the first and second stops.

32. A chain tensioner, comprising:

a tensioner piston bearing upon a chain;

a cylinder guiding the piston for movement in a direction of the chain and bounding with the piston a pressure chamber for receiving hydraulic fluid;

a first leakage gap formed between adjacent wall surfaces of the cylinder and the piston for migration of hydraulic fluid from the pressure chamber;

a second leakage gap for migration of hydraulic fluid from the pressure chamber; and

a control member for reducing a fluid flow through the second leakage gap, as the pressure in the pressure chamber rises.

33. The chain tensioner of claim 32, wherein the control member closes the second leakage gap, when the pressure in the pressure chamber exceeds an upper limit.